Effects of Defensive Vehicle Handling Training on Novice Driver Safety:

Year 2 Interim Report of

Descriptive Statistics from Phase 3

by

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EXECUTIVE SUMMARY

This project is a three-phase effort to evaluate the potential effectiveness of a multistage driver education program for Montana's young drivers. The project objectives are being realized by comparing the safety experience of two groups of teenage drivers, one of which received additional instruction in a defensive driving workshop and another that did not. Phase 1 efforts included selection and recruitment of participants and development of training materials. Phase 2 efforts concentrated on three major areas: 1) final preparation for training, 2) collection of driving experience data, and 3) the presentation of the training to the teen drivers. Phase 3 is a follow-up longitudinal study of the driving experiences and safety of the Phase 2 participants. This interim report summarizes the work done on the project through the period beginning one year after the date of the defensive driving training workshops and includes a presentation of descriptive statistics for safety-related data collected to date. Moreover, this reports the statistical findings from survey data collected from year 2006 to year 2007. Additional analysis in the form of DMV record review is scheduled for the final report.

Together, the statistical finding that the trained group recorded fewer citations does suggest some potential safety benefits for the supplemental driver training course evaluated in this study. However, it remains unclear as to whether the training resulted in an immediate safety benefit. It should be noted that other possible positive outcomes of the training, such as increased knowledge, increased skills, and increased driving adaptability cannot be measured by analyzing the dependent variables collected in the driver survey.

1. INTRODUCTION

Young teenaged drivers have a considerably higher crash rate than any other age group, with new teenaged drivers having the highest crash rates of any group of drivers. While research has struggled to find clear evidence that traditional high school driver education programs have a positive impact on safe driving, the hope is that emerging and future driver education programs will build upon the lessons learned from the traditional approaches to driver education. As one example, some experts have recommended a multistage training approach in which the traditional training is later supplemented by a carefully designed advanced training program. Such an approach is advocated by the American Driver and Traffic Safety Education Association (Robinson, 2001) as part of a graduated licensing system, in which "initial training of novice drivers will provide basic vehicle handling skills and the second training course will provide other safe driving skills, including enhanced decision making to reduce the risk of young drivers."

This project is a three-phase effort to evaluate the potential effectiveness of such a multistage program for Montana's young drivers. Phase 1 efforts included selection and recruitment of participants and development of training materials. Phase 2 efforts concentrated on three major areas—final preparation for training, collection of driving experience data, and presentation of the training to the teen drivers. Phase 3 is a follow-up longitudinal study of the driving experiences and safety of the Phase 2 participants.

During Phase 1, approximately 400 teenaged drivers who had completed high school driver education agreed to participate in the study. The drivers were randomly and evenly divided into a treatment group that received the defensive driving workshop and a control group that did not.

During Phase 2, the young drivers in the treatment group completed a detailed questionnaire developed by the Montana Office of Public Instruction (OPI) concerning their driving experience since completion of driver education classes. They then completed approximately nine hours of instruction in the classroom setting and behind the wheel. These activities were all done at a driver training facility in Lewistown, Montana. More detail about these activities can be found in Kelly and Stanley (2006). The half of the teen drivers who were not drawn to take part in the training workshops were mailed survey forms that were identical to those completed by the students at Lewistown. Approximately 350 usable responses to the questionnaire were received from the two groups.

During Phase 3, the driving experiences of the trained and non-trained drivers are being followed for a period of four years. Using the OPI-developed written questionnaires mailed to each participant, reports of crash and violation histories of the participants were obtained. This interim report summarizes the work done on the project for the two-year period since the end of the defensive driving training workshops and includes analyses of safety-related data collected to date.

2. BACKGROUND

2.1. The Experience of Young Drivers

Each year, roadway crashes take the lives of approximately 40,000 people and seriously injure another three million in the United States (U. S. Department of Transportation, 2005). The cost of these crashes approaches $200 billion.

Teenaged drivers have a considerably higher crash rate than any other age group. Figure 1 shows that drivers under the age of 20 have a crash rate four times that of the general driving population (Williams, 2003). New teenaged drivers have the highest crash rates of any group of drivers. The highest crash rate is experienced within two years of receiving the driving license. As expected, the crash rate decreases with driving experience and increased maturity. Research is needed to determine how to safely equip novice drivers with the important elements of experience before they encounter a need for it in an actual driving situation. Many novice drivers' crashes involve improper reactions to skids, panic stops, run-off-pavement, and other unusual situations unfamiliar to the young driver. Other crashes can partially be attributed to lifestyle issues such as risk-taking, risk-seeking, peer pressure and approval, distraction, and substance abuse.

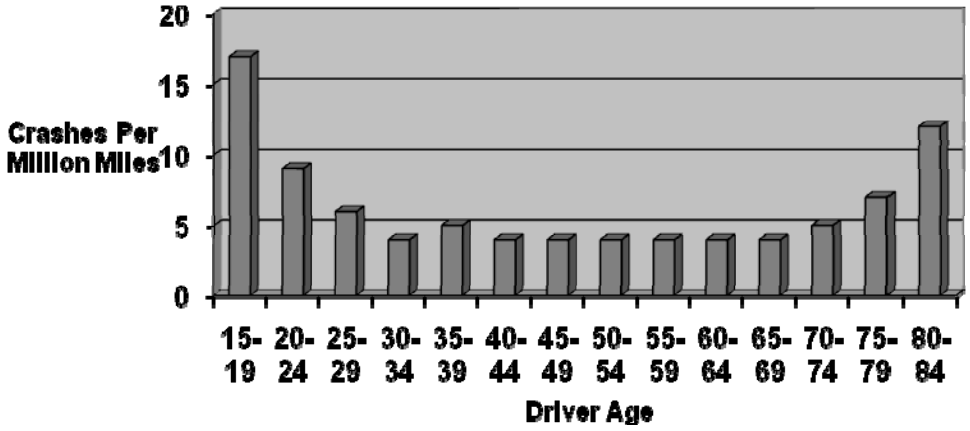

Figure 1. Crash Rate by Driver's Age.

In the United States, most driving training is provided informally by parents or, more formally, in high-school-affiliated classes. These classes require numerous hours (typically 30) of classroom instruction on rules of the road, vehicle operation, and safety. The nascent drivers then spend several hours (typically six) behind the steering wheel driving in parking lots or in normal traffic on familiar streets. Only rarely do they experience circumstances in which the vehicle must be handled at its performance limits.

Driver education in European countries is much more rigorous than that in the United States. Classroom training is presented on vehicle operating principles and basic maintenance. Typically, behind-the-wheel training provides more emphasis on the more advanced aspects of vehicle handling in potentially hazardous conditions. Classroom training provides more emphasis on cognitive factors such as risk perception. Also, the minimum age for driver licensing (typically 18 years) is usually higher than the ages mandated by the states in the United States (Siegrist, 2003).

Several organizations in the United States offer training in advanced vehicle handling for novice drivers (Car Control, n.d.a). Such training is intended to supplement basic driving classes and typically includes vehicle control on skid pads, obstacle avoidance, rapid deceleration braking, and maneuvering near the vehicle performance limits. While there is considerable anecdotal evidence that such training, added to the standard driver instruction, creates a more skilled and capable novice driver few systematic studies of its effect on the safety of young drivers have

been completed. Where such studies have been done, results are contradictory and subject to interpretation and controversy.

2.2. Research on Driver Training

Many questions have been raised concerning the effectiveness of conventional young driver education programs. A former researcher at the Insurance Institute for Highway Safety, Williams (2003) declared these short-term programs to be unrealistic approaches to increasing the safety of young drivers. Conversely, a recent study conducted by the Oregon Department of Transportation (ODOT) and the Center for Applied Research found "significantly lower rates of convictions, suspensions and crashes" for those taking the driver education course versus those who learned through 50 hours of informal, supervised training (Triplett, 2005).

International literature demonstrates little proof that formal driver instruction increases driver safety, yet arguably these programs have failed to adequately address age- and experience-related factors that contribute to a young driver's increased risk of crashes. It is believed that such programs can be more effective if they are more empirically based, addressing the age- and experience-related factors (Mayhew and Simpson, 2002). Mayhew and Simpson state the reasons why formal instruction fails to reduce crashes:

- Driver education/training fails to teach the knowledge and skills critical for safe driving.
- Driver education does teach safety skills but students are not motivated to use them.
- Driver education fosters overconfidence.
- Driver education fails to adequately address lifestyle issues.
- Driver education fails to tailor content to student needs.

The well-known Dekalb driver education study, conducted in suburban Atlanta, was one of the first attempts to systematically validate the benefits of driver education (Stock, et al., 1983). A cohort of 16,000 high school students was examined. The participants were divided into three groups based on the training they received, i.e., no training at all, a minimal curriculum of 20 hours of training, or a Safe Performance Curriculum (SPC) of 70 hours of training. The SPC curriculum was based on a task analysis of required driver skills but little information survives about how it was conducted. The bottom line finding was that there was no statistically significant difference in driving safety between the training groups after the first six months after completion. One observation was that drivers in the "no training" group delayed obtaining their driver's licenses as compared to drivers in the other groups. The methodology has generated considerable subsequent debate, especially concerning the possible lack of equivalency of the three groups and the inadequacy of the selected null hypothesis statistical testing (NHST) statistical model to show differences between them. Despite its limitations, this classic study has widely been considered the definitive evaluation and used as evidence to support the subsequent defunding of many high school driver education programs.

Mayhew and Simpson (2002) completed a synthesis of research related to safety benefits of young driver training. They concluded that the major effect of traditional, school-affiliated driver education programs is to make licensing more readily available to younger drivers. They

found no clear evidence that these traditional programs have a positive impact on safe driving. The authors recommended a multistage training approach in which the traditional training is later supplemented by a carefully designed advanced training program that:

- Is focused on psychomotor, cognitive, and perceptual skills shown to be associated with high collision rates among young drivers;
- Includes experiences demonstrating the value of safe driving practices;
- Incorporates experiences that make the drivers more aware of their own limitations;
- Uses techniques developed to address lifestyle and risk-taking behaviors; and
- Recognizes that there are individual differences in skill levels and addresses specific skill deficiencies of the individual participants.

Such an approach is advocated by the American Driver and Traffic Safety Education Association as part of a graduated licensing system in which, according to Robinson (2001), "Initial training of novice drivers will provide basic vehicle handling skills and the second training course will provide other safe driving skills, including enhanced decision making to reduce the risk of young drivers."

A study of over 400 graduates of an urban, east coast course for young, previously licensed drivers reported that the graduates had 77 percent fewer crashes than their peers (Car Control, n.d.b). That number, however, was probably inflated by a weak research design in which the more careful and highly motivated teens were self-selected into the training classes. A much more carefully designed and controlled study was needed to validate those striking results.

Skill-based training has created much discussion among driver education experts. Research has shown that skill-based strategies may produce overconfidence toward one's own skills (Gregersen, 1996a). For example, Glad (1988) found that those taking part in skid training as a mandatory part of the training had an increase in slippery road crashes. Another study found that after the introduction of skid training into the education curriculum, higher rates of crashes occurred in slippery road conditions (Keskinene et al., 1992). It is believed that many skid training courses were based on maneuvering skills, leading to overconfidence. To counter this effect, it has been suggested that a distinction be made between training of skills and training of risk-awareness. Skill-based training concerns understanding vehicle control and maneuvering while risk awareness is designed to increase knowledge, experience and recognition of dangers (Gregersen, 1996b; Sanders, 2003). A study on the effectiveness of skid-car training for teenage novice drivers in Oregon found that females who received skid-car training had no change in crash rates, while the males appeared to have higher rates in the two years after training. However it did appear that those receiving the training had relatively fewer slick-surface and rear-end collisions (Jones, 1995).

The European Union (EU) Advanced project (Sanders, 2003) developed several recommendations for post-license driver training. These recommendations were not objectively based but were based on the consensus of the researchers and investigators working in the area. The general recommendations include:

- Courses should focus on the specific needs of the participant and encourage them to improve their driving style and behavior.

- Track-based driver courses should focus more on risk awareness than on maneuvering skills.
- Comprehensive feedback and discussion sessions should be conducted after each on-road exercise.
- To maintain individual attention, group size should not exceed 10 participants per instructor during track-based courses.
- Training must be relevant to real-life situations, and exercises and discussion should be related to real life scenarios.
- Overconfidence should be avoided; this is done by allowing students to fail (i.e., hit obstacles, or lose full or temporary control of the vehicle).
- Good client-trainer relations should be established to have the greatest influence on the participant throughout the course.

Graduated licensing programs have been shown to significantly reduce young driver crashes and fatalities (McKnight and Peck, 2002). While these programs don't necessarily improve the skills of young drivers, they do reduce their miles of driving and their exposure to peer pressure and hazardous driving conditions during their early driving years (Fohr, et al., 2005). During the 2005 legislative session, a form of graduated licensing was instituted for Montana. Since implementation only began in 2006, it is too early to determine whether the expected benefits will materialize.

3. METHODOLOGY

Approximately 400 teenaged drivers who had completed high school driver education agreed to participate in this study. These drivers were randomly split into two groups of approximately equal size. One group received additional instruction in a defensive driving workshop; the other group did not. Their subsequent driving safety experience over the following four-year period is being tracked to assess whether the additional driver training has an impact on their safety. The large size of the sample and random assignment of the participants to the control and treatment groups will allow for this assessment of cause and effect to be confidently made.

3.1. Overview of Training

The Montana OPI scheduled Lewistown Driver In-Vehicle Education (D.R.I.V.E.) facilities and instructors for 18 one-day sessions during the summer of 2005. Each day, 12 young drivers were scheduled to take the training workshops in Lewistown. The Western Transportation Institute (WTI) contracted with school bus providers for the Great Falls and Billings school districts to provide transportation to and from Lewistown. Students from Harlem were bused by their high school, which does not contract out its transportation services. Students from Lewistown and the surrounding communities provided their own transportation to the training facility.

At the training facility, the young drivers completed a subject consent form and a detailed survey concerning their driving experience since completion of driver education classes. They then completed approximately nine hours of instruction in the classroom setting and behind the wheel. At the completion of the day's training, each student received a tailored "report card" concerning his or her driving performance, and exercises they could do on their own to improve it. The training is presented in more detail in Kelly and Stanley (2006).

The half of the teen drivers who were not drawn to take part in the training workshops were mailed survey forms that were identical to those completed by the students at Lewistown, and were asked to complete and return them to WTI.

3.2. Driving History

After all students were finished with the pretest, they proceeded to the classroom for opening classroom activities, where they completed a human subject consent form. The detailed young driver survey completed by the participants regarding their driving experience since completing their driver education class was developed by the Montana OPI. The questionnaire was tailored to ask those questions that correlate highly to teen crash involvement, as determined from teen crash data. Information solicited by the survey included:

- The number of hours per week they usually drive;
- The number of passengers (and age classification) usually in the vehicle and how often they have passengers in their car;
- Type of vehicle driven;
- Time of day they usually drive;
- History of traffic citations and warnings;
- History of near-miss crashes;
- History of single-vehicle crashes; and
- History of multiple-vehicle crashes.

The survey is provided in Appendix A.

3.3. Classroom Instruction

Upon completing the young driver survey and receiving the student folder of instructional materials the students that received the defensive driving workshop were taken to the Montana D.R.I.V.E. classroom training facility. Training is described in detail by Kelly and Stanley (2006). Here training was done in two classroom periods (morning and afternoon) led by a classroom instructor. Both the morning and afternoon classroom instruction included PowerPoint presentations. The purpose of these presentations was to inform the students of driver readiness with reference to seat adjustment, mirrors, driver position, use of the ”dead pedal,” seat belts, balanced hand position on the wheel, and windows up.

Brief overviews of the material presented in the classroom sessions are provided below.

- Morning Classroom: “Montana Teen Class Phase I” presentation was provided to facilitate the lecture. Further demonstrations were provided with regard to the effects of high speeds on losing control of the vehicle. This included using a small “frisbee” type saucer and matchbox cars to demonstrate the effects of speed on friction of the vehicle’s wheels. A slide-by-slide explanation of the Montana Teen Class Phase I PowerPoint presentation as lectured to the students was previously provided to MDT in the Training Materials.

- Afternoon Classroom: "Montana Teen Class Phase II" presentation was provided to facilitate the lecture. No further demonstrations were provided. A slide-by-slide explanation of the Montana Teen Class Phase II PowerPoint presentation as lectured to the students was previously provided to MDT in the Training Materials.

Integrated with the PowerPoint presentations were two interactive sessions using E-book activities, one in the morning and the other in the afternoon. Within the two E-book periods were embedded video clips demonstrating principles discussed. Provided in the E-book were interactive grids where students were to mark their answers to questions that were posed to them on principles discussed. Upon completion, students could check their answers with the provided answer sheets.

A picture of the classroom instruction portion at the Montana D.R.I.V.E. training facility is provided in Figure 2. The classroom is a retired driver simulator trailer about 12' wide and 40' long. Three computers were set up to deliver the E-book training. A fourth computer was used to deliver the PowerPoint. Students sat in inactive simulator stations during the classroom instruction.

Figure 2. Instructional Classroom at Montana D.R.I.V.E. Training Facility.

Additional classroom instruction was completed out-of-doors at the Montana D.R.I.V.E. training facility to allow students more arm and leg room to practice maneuvers as instructed.

3.4. Behind-the-Wheel Instruction

Behind-the-wheel instruction was done using three sedans equipped with SkidMonsters, a proprietary device used to teach vehicle control and skid recoveries. Two other sedans were equipped with levers to activate rear brakes. An additional regular sedan and a mid-1990s sport utility vehicle were used to teach reference points and off-road recovery. Figure 3 shows a vehicle equipped with the SkidMonster technology.

Figure 3. Student Participating in SkidMonster Behind-the-Wheel Instruction.

The two lever-equipped skid sedans were used in pre- and post-instruction skid assessments. The three SkidMonster vehicles were used to teach behaviors and skills related to the "10 Habits" documented by Mottola (2003). The driving track used was a paved "Monster Pad" that is 200' by 600'.

At the conclusion of the behind-the-wheel instruction and the post test on the wet skid pad, instructors took the students to the Monster pad and divided the group into two teams. They then had a "road rally" with each team member driving through the course in a timed event that included all aspects of training covered throughout the day. Rules and separate grade sheets were given beforehand so the drivers would know what to expect.

Anecdotal reports from students who went through the workshop indicated that they felt more relaxed and confident about their driving ability. Instructors reported "they made great strides, showing improvement in the post-test of front/side limitations and skids; and, they also understood the importance of controlling the four-second danger zone and keeping the vehicle in balance." Overall, the students gained valuable knowledge and skills with regard to driving, and became more confident in their ability to handle various driving situations. Analysis of the vehicle handling scores, especially skid recovery, showed significant improvement in vehicle handling between the pre-testing and the post-testing.

3.5. Collection of Safety Data

As previously discussed, during the initial year of the study while training was being conducted, participants completed a written survey (Appendix A) of their driving experience that was developed by the Montana OPI. Participants who did not take part in the training were mailed the questionnaire during the same timeframe and reimbursed for their time in completing it.

At the end of the first year after the defensive driver training was conducted, an identical survey covering the year ending in August 2006 was mailed to the study participants. They were

reimbursed with a $20 payment for their time in completing and returning the survey. Approximately 350 surveys were mailed with a goal of obtaining an 80 percent return rate.

On the initial mailing, approximately 180 usable surveys were returned for a response rate of about 55 percent. An additional 12 surveys were returned by the post office as undeliverable. A second mailing was sent to the non-responders with another copy of the survey form and a reminder letter. Follow-ups were also sent to participants who had moved and had valid forwarding addresses. Another 50 responses were received to this mailing, bringing the return rate for usable forms to approximately 68 percent, still below the goal of 80 percent.

In October 2006, a third mailing of forms and a reminder letter were sent to those who had not yet responded. A return of 44 responses to that mailing brought the total number returned to 278, reaching the desired 80 percent return rate.

The need to send three mailings and wait for responses in order to obtain the desired response rate was not anticipated and caused considerable delay in the progress of Phase 3 of the project. Based on this experience, multiple mailings and reminders will be planned for as data is collected in future study years.

Figure 4 provides a timeline of the project's data collection periods for Phase 3.

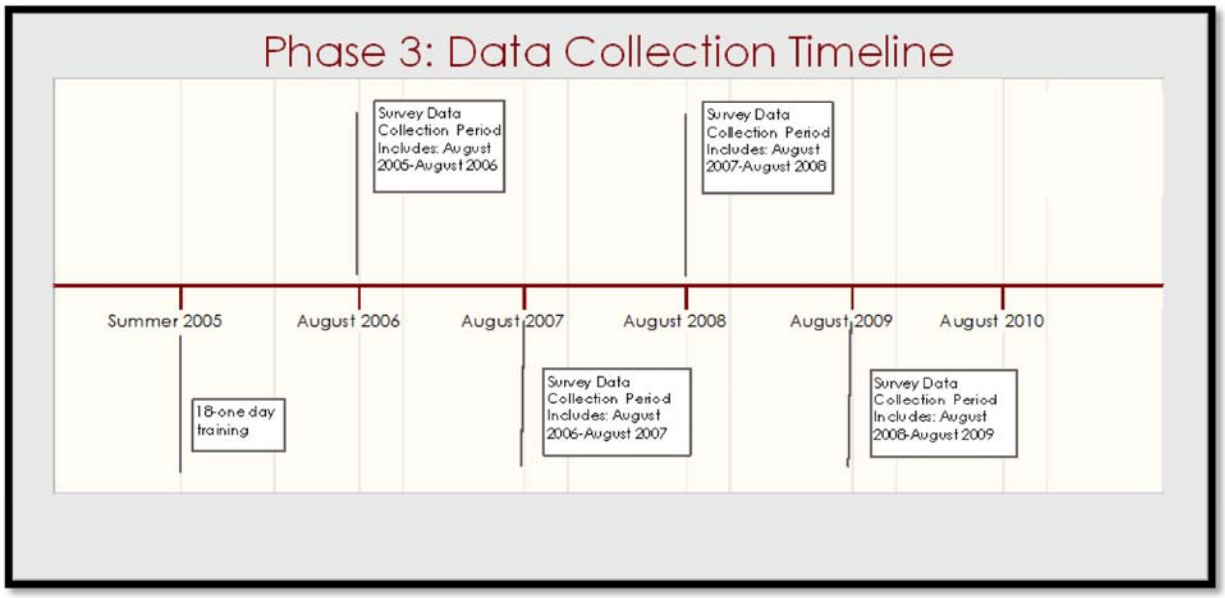

Figure 4. Project Timeline.

3.6. Develop Data Base for Archiving and Analysis

During Year One, all survey data were obtained in written form on paper but were not electronically archived. Because of the expected volume of data, a hardcopy data base would have become unwieldy for archiving and analyzing data. An electronic data base allowing for continual update of contact information for participants and to record their information was needed. In order to support archiving and analyzing the data, an EXCEL spreadsheet was developed to record all of the data obtained in 2005, in 2006, and in future years.

Data provided by the participants during Year One (2005) were transferred from their paper forms onto the EXCEL data sheet. The EXCEL data base contains names and updated mailing

addresses of all participants and the driving experience data they report each year. It is suitable for preparing mailing labels for contacting participants as well as archiving/analyzing data. As written forms were received from participants, the data they submitted was entered for analysis.

4. RESULTS

4.1. Test and Control Group Baseline

Preliminary analyses were conducted on the 2005 data to document the experience and history of the young drivers in their first months after high school driver training and to further ensure that the Intervention Group (those who had received the training) and the Control Group were equivalent on traffic-safety-relevant attributes before the defensive training workshops were presented. During the initial driving period, approximately 18 percent of the drivers in both groups reported experiencing crashes. Approximately 17 percent of the Intervention Group and 19 percent of the Control Group were given traffic citations or warnings. These data serve to demonstrate that using the random group assignment assured the groups were equivalent before the training workshops.

4.2. Post-intervention Data

Descriptive statistics were summarized for the 2006 and 2007 safety performance data (the first year following the added defensive driving workshops). The dependent variables, termed "incidents," reported by each driver were grouped into five main categories: citations, near-miss collisions, single-vehicle collisions, multiple-vehicle collisions, and total collisions. Citations included moving warnings, moving violations, parking tickets, and minors in possession (MIP). Near-miss collisions were incidents that did not occur but were avoided by a narrow margin. Single-vehicle incidents were events that involved only the driver's vehicle, and multiple-vehicle incidents involved two or more vehicles. The total number of collisions included both single and multiple vehicle incidents. In order to garner the effectiveness of the training program inferential statistics (non-parametric, Chi^2) were used to test for the statistical significance of group membership and performance year. A Chi-squared analysis on frequency counts was used to determine statistically significant relationships for each incident type (citation, near miss, single vehicle, multiple vehicle, and total collision) within each group over time, as well as within each time period between each group. When a statistically significant difference ($p<0.05$) was calculated the respective Chi-square and p-values were reported.

Table 1 below provides a summary of the number of incidents for the case and control groups in 2006 and 2007 for each dependent variable collected. To determine the effect size of the trained group versus the untrained group an odds ratio was calculated. The odds ratio is defined as the ratio of the odds of an incident occurring in one group to the odds of it occurring in another group, or a sample-based estimate of that ratio. In this case, the odds ratio was generated to determine the odds of an incident, e.g. receiving a citation, in the untrained group to the odds of receiving a citation in the trained group. The odds ratio calculation is shown in Equation 1.

$$\frac{p/(1-p)}{q/(1-q)} = \frac{p(1-q)}{q(1-p)}$$

Equation 1: where probabilities of the event in each of the groups are *p* (untrained/control group) and *q* (trained/case group)

An odds ratio of 1 indicates that the incident under question is equally likely to occur in both the trained and untrained group. When the odds ratio is greater than 1, this indicates that the incident under question is more likely to occur in the untrained group. If the odds ratio is less than 1, this indicates that the incident is less likely to occur in the untrained group. The odds ratio has been calculated for 2006 and 2007 data in Table 1 below. In reference to the 2006 data, the number of citations, near-misses, multiple collisions, and total collisions are more likely to occur in the untrained group, whereas the numbers of near-misses are more likely to occur in the trained group. In 2007, the untrained group is more likely to receive citations, be involved in near misses, and experience multiple collisions, while those in the trained group are more likely to be involved in single collisions and total collisions. Clearly the results are mixed in terms of the training program's effectiveness.

Table 1. 2006 and 2007 Participant Survey Results.

2006								
	Case Subjects		Control Subjects					
	No Incidents	**Incidents**	**No Incidents**	**Incidents**	**Case Incident Involvement**	**Control Incident Involvement**	**Difference (Case/ Control)**	**Odds Ratio***
Citations	118	29	97	41	20%	30%	-10%	1.7*
Near Miss	84	63	89	49	43%	36%	7%	0.7
Single Collision	128	19	120	18	13%	13%	0%	1.0
Multiple Collision	126	21	112	26	14%	19%	-5%	1.4*
Total Collision	112	35	101	37	24%	27%	-3%	1.2*
2007								
	Case Subjects		Control Subjects					
	No Incidents	**Incidents**	**No Incidents**	**Incidents**	**Case Incident Involvement**	**Control Incident Involvement**	**Difference (Case/ Control)**	**Odds Ratio***
Citations	86	39	80	65	31%	45%	-14%	1.8*
Near Miss	89	36	95	50	29%	34%	-6%	1.3*
Single Collision	109	16	132	13	13%	9%	4%	0.7
Multiple Collision	99	26	107	38	21%	26%	-5%	1.4*
Total Collision	85	40	102	43	32%	30%	2%	0.9

** incident under question is more likely to occur in the untrained group.*

Because the results from the odds ratio were mixed, additional statistical analysis was performed regarding the training program's effectiveness. By analyzing the 2006 survey data, it was determined that there was a statistically significant difference (χ^2=3.828, p = 0.05) in the number of citations between the trained/case and untrained/control group. As shown in Figure 5, those in the trained group reported fewer citations than those in the untrained group. Thirty percent of the untrained students reported receiving one or more citations, and 20 percent of the trained group reported receiving one or more citations. Similarly, in 2007 a statistically significant difference (χ^2=5.33, p = 0.02) was determined between the trained and untrained group. Those in the trained group reported receiving fewer citations (31.2 percent) than those in the untrained group (44.8 percent).

The number of students who received one or more citations increased over time for both the case and control groups. In the case group, 19.7 percent reported receiving one or more citations in 2006, increasing significantly (χ^2=4.742, p = 0.029) to 31.2 percent in 2007. The control group demonstrated significantly (χ^2=6.898, p = 0.009) higher percentages of citations in 2007 than in 2006—29.7 percent reported one or more citations in 2006, 44.8 percent in 2007 (Figure 5).

Overall, in terms of the number of citations, it appears the training is more effective than no training. However, both groups witnessed an increase in the number of citations from 2006 to 2007.

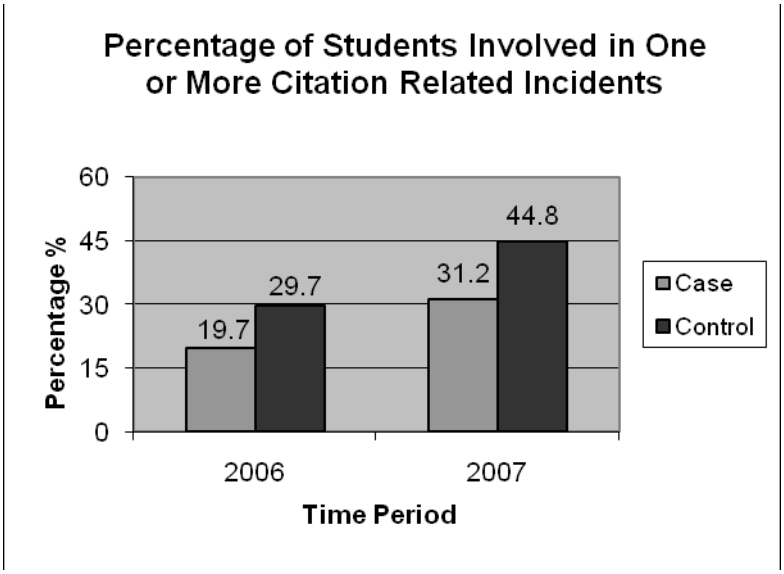

Figure 5. Percentage of Students Receiving Citations.

In terms of the number of one or more near-miss incidents, those in the control group remained nearly constant from 2006 (35.5 percent) to 2007 (34.5 percent). For those in the case group, the percentage of participants who reported being involved in a near-miss collision fell significantly (χ^2=6.898, p = 0.009) from 42.9 percent in 2006 to 28.8 percent in 2007 (Figure 6). No significant differences were found between the case versus the control group in the number of near-miss incidents.

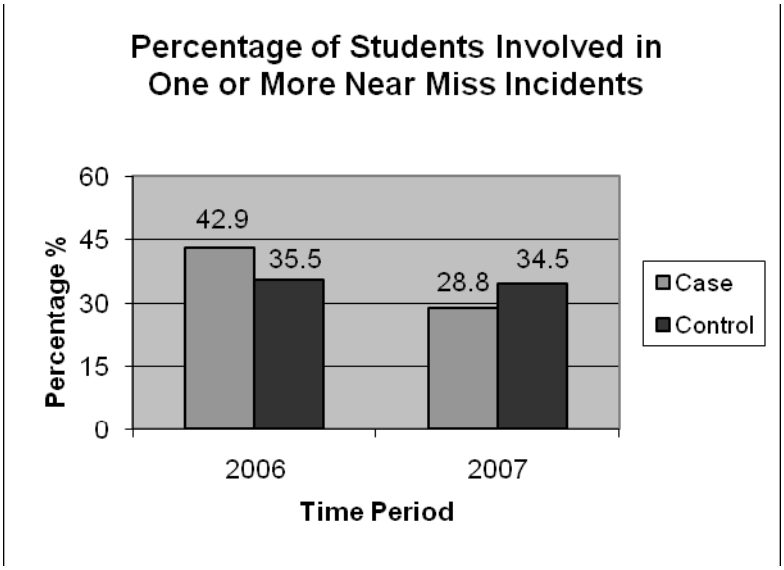

Figure 6. Percentage of Students Involved in Near-miss Incidents.

The percentage of case participants involved in single-vehicle collisions stayed fairly consistent, dropping from 12.9 percent in 2006 to 12.8 percent in 2007, whereas the control participants showed a decrease from 13.0 percent in 2006 to 9 percent in 2007 (Figure 7). No significant differences were found between the case versus the control group in the number of single-vehicle collisions.

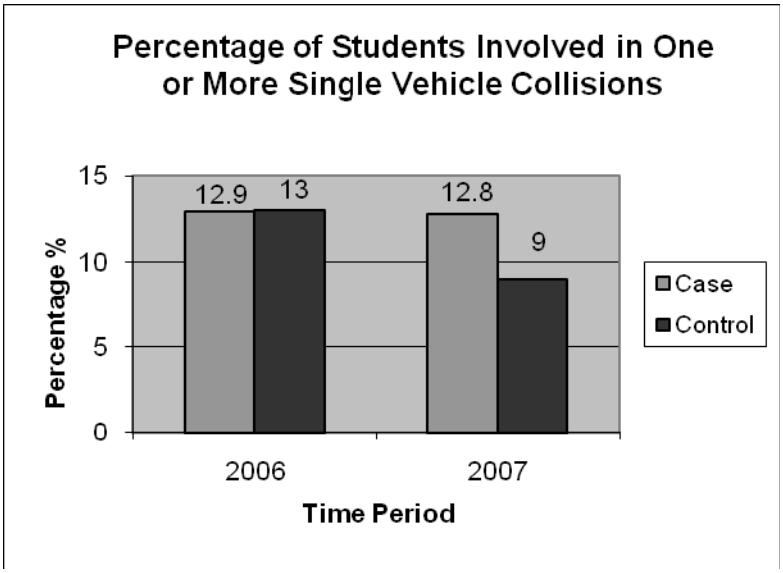

Figure 7. Percentage of Students Involved in Single-vehicle Crashes.

Similar to the citation findings, those in the case group were involved in consistently fewer multiple-vehicle collisions than the control group. However, participants involved in multiple-vehicle collisions increased for both the case and control groups over time, with the control group showing a higher percentage of involvement than the case group in both time periods. The percentage of case group participants involved in multiple-vehicle collisions rose from 14.3 in 2006 to 20.8 in 2007. The control group showed a larger increase, from 18.8 percent in 2006 to

26.2 percent in 2007 (Figure 8). No significant differences were found between the case versus the control group in the number of multiple-vehicle crashes.

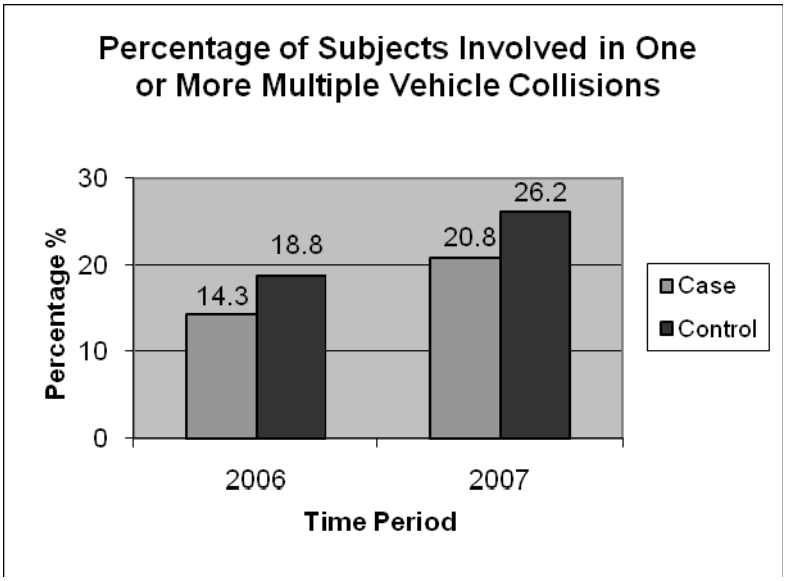

Figure 8. Percentage of Students Involved in Multiple-vehicle Collisions.

The number of study participants who were involved in a collision, either single-vehicle or multiple-vehicle, increased over time for both the case and control groups—23.8 percent of the case participants reported being involved in either type of collision in 2006, compared to 32.0 percent in 2007. The control participants showed higher percentages of accidents than the case group in 2006, with 26.8 percent, but showed a lower percentage than the case group in 2007, with 29.7 percent reporting a collision (Figure 9). No significant differences were found between the case versus the control group in the number of total vehicle crashes.

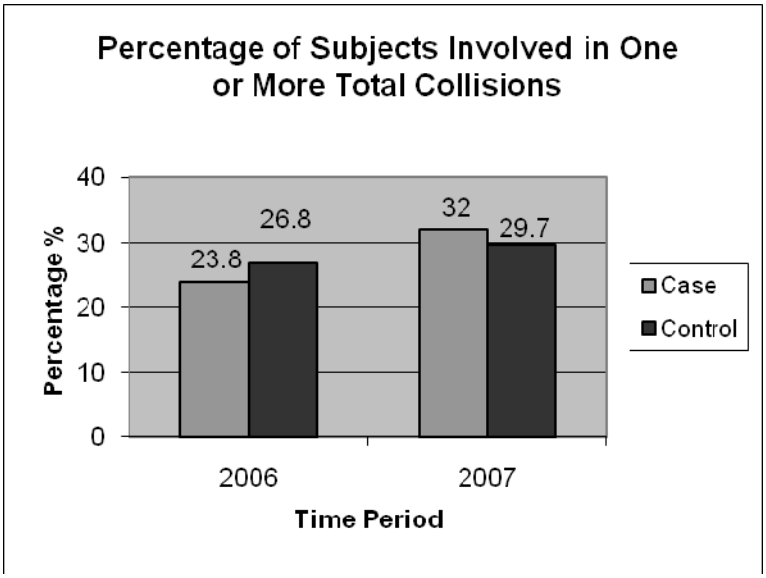

Figure 9. Percentage of Participants Involved in Collisions.

5. DISCUSSION AND CONCLUSIONS

This report summarizes the descriptive statistics and statistical analysis for the self-reported safety-relevant driving performance of one group of teen drivers that received additional driving training compared to a second group that did not experience any supplemental training. The preliminary review of the self-reported safety data indicates that the *only true statistically significant finding was that during both 2006 and 2007, the trained group participants had significantly fewer citations than those in the untrained group*. Perhaps the number of traffic violations (citations or warnings) is better correlated with defensive driving skills than the frequency of crashes since these are based on direct expert observation of illegal or hazardous driving.

The statistical finding that the trained group recorded fewer citations does suggest some potential safety benefits for the supplemental driver-training course evaluated in this study. *However, it remains unclear as to whether the training resulted in an immediate safety benefit.* It should be noted that other possible positive outcomes of the training, such as increased knowledge, increased skills, and increased driving adaptability cannot be measured by analyzing the dependent variables collected in the driver survey. The next stage of the project is to consider other metrics of safety performance such as DMV records in order to garner a more objective glimpse into the effects of the training program. Moreover, additional years of data collection should ultimately shed light on the training program's effectiveness.

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APPENDIX A: YOUNG DRIVER SURVEY

YOUNG DRIVER SURVEY

Name (as appears on driver license) _____ Driver License # _____

Address _____ City/State _____ Zip _____

Gender: M F Date of Birth _____ How long have you been driving? Years_____ Months_____

1. What city/school did you receive driver education? _____

2. How many hours a week do you usually drive? Check one: Under 2__ 3-5___ 6-10___ 11-15____
16-20____; more than 20____

3. How often do you have passengers in your vehicle?
Check one: Daily____ Weekly_____ Seldom_____
Are passengers usually (check all that apply)
family____ non-family____ teens____ adults ____
On average how many passengers each trip? _____

4. What type(s) of vehicles do you usually drive? Check ones that apply:
Car: Small___ Medium___ Large___
SUV: Small___ Medium___ Large___
Pickup: Small___ Medium___ Large___
Other_____ Describe_____

5. What hours of the day do you usually drive? Check ones that apply: 6am – noon ___;
Noon – 6 pm___; 6 pm – 9 pm___; 9 pm – mid-night___; Mid-night- 6am___

6. In the past year have you received any of the following legal citations; if so how many?
Moving violations (tickets) _____; Moving warnings _____; MIPs_____
DUIs _____; Suspended license_____
Other_____Describe_____

7. In the past year, have you had any near miss crashes; if so how many? _____
Describe your near misses, if any._____
_____
_____
_____

8. In the past year have you had any single vehicle crashes (yours was the only vehicle involved), such as running off the road? If so, how many? _____
Briefly describe: _____
_____
_____

9. In the past year have you had any multiple vehicle crashes (yours was not the only vehicle involved); if so how many? _____
List and briefly describe the crashes, if any _____
_____
_____

Please complete and return this survey by August 15, 2006 and we will send you $20.

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